

---

# Table of Contents

<b>Acronyms and Abbreviations .....</b>	<b>V</b>
<b>Chapter 1 Executive Summary .....</b>	<b>1-1</b>
1.1 What is the Benefit/Cost Analysis? .....	1-1
1.2 What Information was Used for the Benefit/Cost Analysis? .....	1-2
1.3 What is Cost Effectiveness and How was it Determined? .....	1-3
1.4 What were the Results of the Benefit/Cost Analysis? .....	1-3
1.5 What's in the Report? .....	1-4
<b>Chapter 2 Introduction .....</b>	<b>2-1</b>
2.1 Background .....	2-2
2.1.1 Regional System .....	2-2
2.1.2 Local Agency Systems .....	2-3
2.2 Data Needed for the Benefit Cost Analysis .....	2-3
2.3 Benefit/Cost Analysis Tool .....	2-7
2.4 Alternatives for Evaluating Benefit/Cost .....	2-7
<b>Chapter 3 Data Development .....</b>	<b>3-1</b>
3.1 Data Required for the Benefit/Cost Analysis .....	3-2
3.2 Data Sources .....	3-2
3.2.1 Characterizing Local Agency Facilities .....	3-2
3.2.2 Rainfall .....	3-3
3.2.3 Flow Monitoring .....	3-5
3.2.4 Modeling .....	3-10
3.2.5 Pilot Projects .....	3-24
3.2.6 Alternatives .....	3-34
<b>Chapter 4 Benefit/Cost Analysis .....</b>	<b>4-1</b>
4.1 What Defines Cost Effectiveness? .....	4-3
4.2 Benefit/Cost Analysis Tool Process Steps .....	4-5
4.3 Candidate Regional Conveyance System Improvement (CSI) Projects .....	4-11
4.4 Confidence Factors .....	4-12
4.5 Identified Cost-Effective I/I Projects .....	4-12
4.5.1 CSI Project Lists .....	4-12
4.6 Sensitivity Analysis of Selected Projects (Alternative 3: Project-Specific) .....	4-19
<b>Chapter 5 Summary .....</b>	<b>5-1</b>
5.1 Nine Cost-Effective Projects .....	5-2
5.1.1 West Point Wastewater Treatment Plant Service Area - I/I Reduction Project .....	5-3
5.1.2 South Wastewater Treatment Plant Service Area - I/I Reduction Projects .....	5-5
<b>Glossary .....</b>	<b>G-1</b>

**List of Tables**

Table 3-1. I/I Flow Components and Sources..... 3-13

Table 3-2. Planning Assumptions for I/I Modeling ..... 3-20

Table 3-3. Conveyance Facility Construction and Allied Cost Assumptions..... 3-21

Table 3-4. Sewer System Components Selected for Rehabilitation ..... 3-27

Table 3-5. Candidate I/I Reduction Techniques ..... 3-28

Table 3-6. Initial Assumptions..... 3-29

Table 3-7. E&P Assumptions ..... 3-30

Table 3-8. Sensitivity Analysis (Initial) Assumptions ..... 3-31

Table 3-9. Unit Costs, E&P Consensus ..... 3-33

Table 3-10. Allied Costs, E&P Consensus ..... 3-33

Table 3-11. Unit Costs, Sensitivity Analysis ..... 3-34

Table 3-12. Conveyance System Improvement (CSI) Projects and Estimated Project Costs..... 3-36

Table 4-1. Iteration Numbering Convention, E&P and Sensitivity (Initial) Costs and Assumption Analysis ..... 4-6

Table 4-2. Types of Facility Improvements ..... 4-7

Table 4-3. Cost-Effective Project List ..... 4-13

Table 4-4. Select Project List ..... 4-14

Table 4-5. Regional Project List ..... 4-18

Table 4-6. Efficiency Assumptions by Technique..... 4-19

Table 4-7. Sensitivity Analysis Unit Cost by I/I Reduction Technique, Initial Assumptions ..... 4-20

Table 4-8. Alternative 3: Cost-Effective/Project-Specific I/I Removal Summary, Initial Assumptions..... 4-20

Table 4-9. Select Project List, Sensitivity Analysis..... 4-21

**List of Figures**

Figure 3-1. Data Development Process..... 3-1

Figure 3-2. NEXRAD and King County Service Area ..... 3-4

Figure 3-3. Mini-Basin Locations in Relationship to I/I Levels ..... 3-7

Figure 3-4. Model Basin Locations in Relationship to I/I Levels ..... 3-8

Figure 3-5. Flow Meter Locations ..... 3-9

Figure 3-6. MOUSE Hydrologic and Hydraulic Model Components ..... 3-12

Figure 3-7. Simulated Flow Components ..... 3-14

Figure 3-8. Comparison of Modeled Flow Data to Measured Flow Data..... 3-16

Figure 3-9. Conveyance System Improvement Project Locations ..... 3-23

Figure 3-10. Pilot Project Locations ..... 3-26

Figure 3-11. Technique Selection Tree..... 3-32

Figure 4-1. Benefit/Cost Analysis Process ..... 4-2

Figure 4-2. Alternatives Selection Process ..... 4-8

Figure 5-1. Lake Hills Trunk Third Barrel Upgrade..... 5-4

Figure 5-2. South Renton Interceptor Upgrade..... 5-8

Figure 5-3. ULID 1 Contract 4..... 5-9

Figure 5-4. Auburn Twin Tube Storage Facility..... 5-10

Figure 5-5. Issaquah 2 Trunk ..... 5-11

Figure 5-6. Bryn Mawr Tube Storage Facility..... 5-12

Figure 5-7. Eastgate Tube Storage Facility..... 5-13

Figure 5-8. Factoria Trunk and Wilburton Pump Station ..... 5-14

Figure 5-9. ULID 1-5 Garrison Creek Trunk..... 5-15

**Appendices (available on CD upon request)**

Appendix A1 – Select List Cost-Effectiveness Analysis Package per MWPAAC E&P Planning Assumptions

Appendix A2 – Regional Cost Effectiveness Analysis Package per MWPAAC E&P Planning Assumptions

Appendix A3 – 30-Percent I/I Removal Cost Effectiveness Package per MWPAAC E&P Planning Assumptions

Appendix B1 – Sensitivity Analysis Select List-Cost Effectiveness Analysis Packages per Initial Planning Assumptions

Note: the appendices are model output data.